WATER

WATER ACTIVITY: RELATIVE HUMIDITY

WHAT IS RELATIVE HUMIDITY?

BACKGROUND

A. Air can become saturated with water.
B. The temperature of the air determines how much water vapor the air can hold. (The warmer the air the more it can hold)
C. How fast water evaporates into the air is determined by how much water vapor is already in the air.
D. When water evaporates, it absorbs heat. (This is why wind or a fan cools you down on hot, humid days)
E. Relative humidity compares how much water vapor is in the air to how much the air could hold if saturated.
F. Relative humidity is expressed as a percentage.

Example -

The relative humidity is 60%

This means that the air is holding 60% of the water vapor it could hold.

THE ACTIVITY

Purpose:

To Determine the relative humidity of the air in the class room and/or the out doors.

Equipment:

Two Fahrenheit thermometers.
A cotton wick and rubber band.
A relative humidity table.

Procedure:

A. Attach the cotton ball to one of the thermometer bulbs with a rubber band.
B. Read the air temperature and record in the blank called dry bulb reading.
C. Saturate the cotton bulb with water and watch the temperature begin to drop.
D. When the temperature stops dropping, read the thermometer. Record this temperature as the wet bulb reading.
E. Find the difference between the wet and dry bulb readings. Record.
F. Determine the relative humidity from the relative humidity table and record.

Date _____

Time of day _____

Circle one indoor outdoor

Dry bulb reading _____ °F

Wet bulb reading _____ °F

Difference _____ °

Relative humidity _____ %

Lab - Porosity

Make a list of equipment needed.

Observe, feel and describe the difference of sand and gravel. (6)

Procedure:

A. Fill a plastic cup up to a level indicated with a certain material. The line which is marked indicates a volume of 100 ml.(This line should be premarked by the student or the teacher.)
B. Fill the graduated cylinder with 100 ml of water.
C. Pour water into the material until it is just up to the top of the material.
D. Find the porosity of the material in the cup by using the formula. Divide the amount of water used to fill the material by the volume of the material in the cup and multiply your answer by 100.

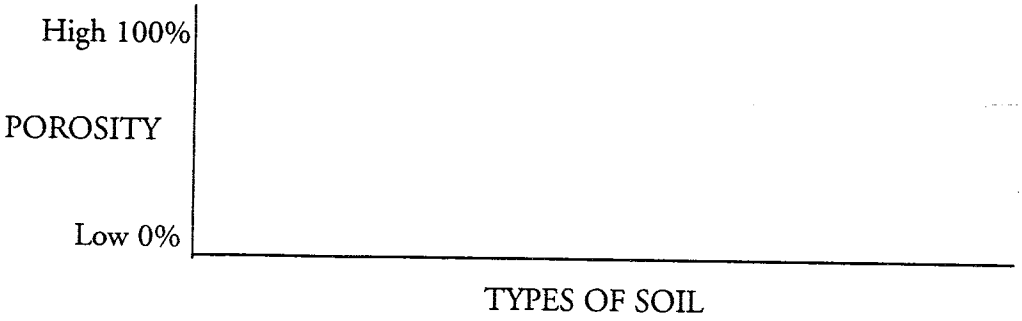
$$\text{POROSITY} = \frac{\text{VOLUME WATER}}{\text{VOLUME MATERIAL}} \times 100$$

Definition: Porosity is the percent of open space in a material. It can range from 0 to 90 percent, but is usually 10 to 50 percent.

Complete the following table:

Material	Description	Volume Soil	Volume Material	Porosity
1.				
2.				
3.				
4.				
5.				
6.				

Graph the porosity against the type of material.



What Do You Know About H2O?

1. How much of the water on the Earth is usable?
   A. 50%
   B. 30%
   C. 10%
   D. 1% or less

2. How much water does a tree give off in 24 hours?
   A. 10 gallons
   B. 40 gallons
   C. 70 gallons

3. How much water is in 1 inch of rain that has fallen on 1 acre of land?
   A. 27,000 gallons
   B. 17,000 gallons
   C. 7,000 gallons

4. Where is most of the Earth's usable water found?
   A. reservoirs
   B. lakes and rivers
   C. underground

5. T or F Underground water would never get as polluted as above ground (surface water).

6. Which source of water supplies us with the most drinking water?
   A. The Great Lakes
   B. Mississippi River
   C. Ohio River

7. Which of these cities has to travel the greatest distance for water?
   A. New York
   B. Los Angeles
   C. Chicago
   D. Houston

8. Who uses the most water?
   A. Farmers
   B. Industry
   C. Power Plants
   D. You and Me

9. Which state uses the most water per person?
   A. New York
   B. Idaho
   C. California
   D. Hawaii

10. How much of sewage is pure?
    A. 30%
    B. 60%
    C. 90%

11. How much water is used in producing a typical meal?
    A. 1 gallon
    B. 25 gallons
    C. 50 gallons
    D. 3,000 gallons

12. How much water do we flush down the toilet?
    A. 2 gallons
    B. 5 gallons
    C. 7 gallons
    D. 10 gallons

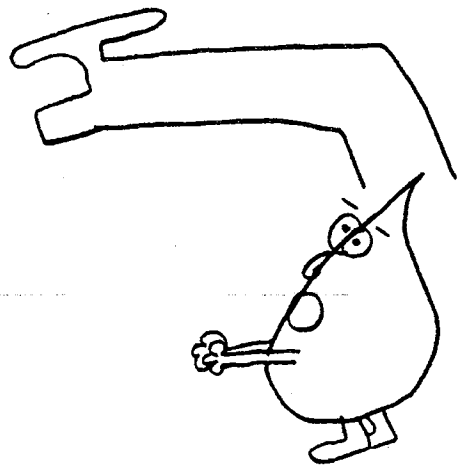
13. T or F Dishwashers use twice as much water as doing the dishes by hand.

14. T or F Taking a ten minute shower instead of a bath will save water.

15. How much water is used during an average shave?
    A. 5 gallons
    B. 10 gallons
    C. 15 gallons
    D. 20 gallons

16. How much water is used sprinkling a lawn?
    A. 50,000 gallons
    B. 100,000 gallons
    C. 200,000 gallons
    D. 400,000 gallons

17. How much water does it take for a car to go through a car wash?
    A. 20 gallons
    B. 40 gallons
    C. 60 gallons
    D. 100 gallons



WATER TALLY

Activity	# of times/day	#of days	Total
Bathroom -			
Flushing toilet	x 5 gallons*=	gal. x	=
Showering	x 30 gallons=	gal. x	=
Bathing	x 40 gallons=	gal. x	=
Brushing teeth	x 1 gallons=	gal. x	=
Kitchen/Laundry -			
Washing dishes by hand	x 30 gallons=	gal. x	=
Dishwasher	x 15 gallons=	gal. x	=
Washing machine	x 30 gallons=	gal. x	=
Outdoors -			
Washing car	x 20 gallons=	gal. x	=
Watering lawn/garden (30 min)	x 240 gallons=	gal. x	=
Other	x gallons=	gal. x	=

Grand Total = _____

* Quantities given are estimates.

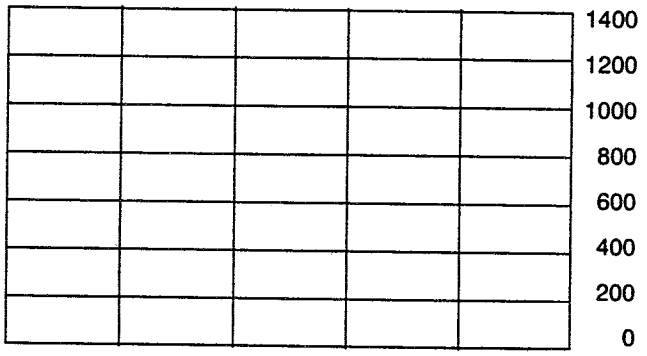
The Great Lakes - Skill: Graphing

The five Great Lakes - Superior, Michigan, Huron, Erie and Ontario - were shaped more than 10,000 years ago. They were formed when the glaciers retreated at the end of the last ice age. The lakes are the largest group of freshwater lakes in the world. To learn more about these Great Lakes, complete the graphs below.

Bar Graphs

Even though four of the five Great Lakes are at about the same elevation level, they vary greatly in their depths. Make a bar graph below using the information given. Graph from the shallowest lake to the deepest lake. Don't forget to label the lakes!

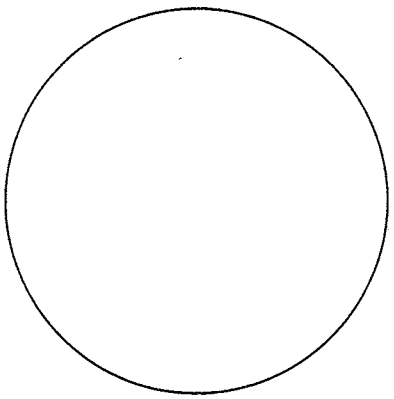
Lake	Depth in feet
Huron	750
Superior	1,333
Ontario	802
Erie	201
Michigan	923



Double Line Graphs

Below is some information about the width and length of each Great Lake. Make a double line graph using the information. For the widths, use a green pencil or marker. For the lengths, use a red pencil or marker.

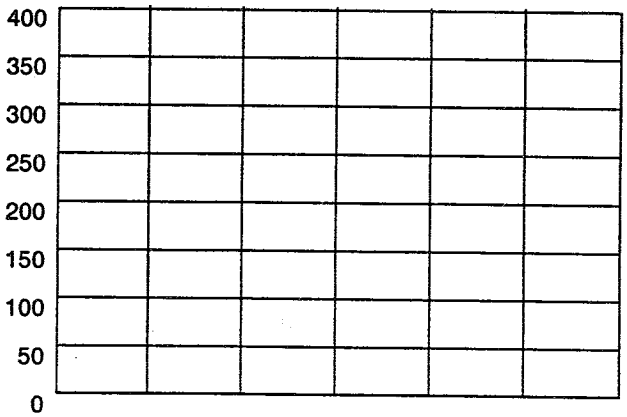
Lake	Width in Miles	Length in Miles
Huron	183	206
Superior	160	350
Ontario	53	193
Erie	57	204
Michigan	118	307



Circle Graphs

The total area of the five Great Lakes is 94,510 square miles. The largest of the lakes is Lake Superior which is 34% of the total area. Lake Ontario is the smallest at only 8% of the total area. The other Great Lakes are Lake Erie at 10%, Lake Huron at 24.4% and Lake Michigan at 23.6% of the total area.

Divide the circle graph above to show the percentages of the total area of each lake. Then, label each percentage.



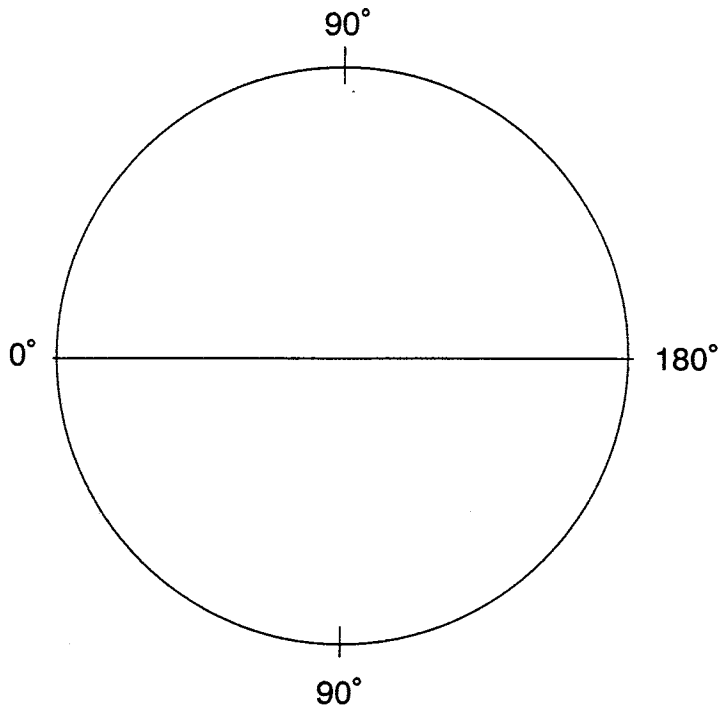
Graphing

Student name _____

Lake Name _____

1. Graph the amount of water in the Northern and Southern hemispheres

Label the hemispheres.



_____

Equator

_____

Do this for the Northern hemisphere.

Convert 60% to a decimal _____

_____ x 180° _____°

Do this for the Southern hemisphere.

Convert 80% to a decimal _____

_____ x 180° _____°

Use a protractor to mark off the degrees then label water and land in each hemisphere.

How are the oceans and continents arranged?

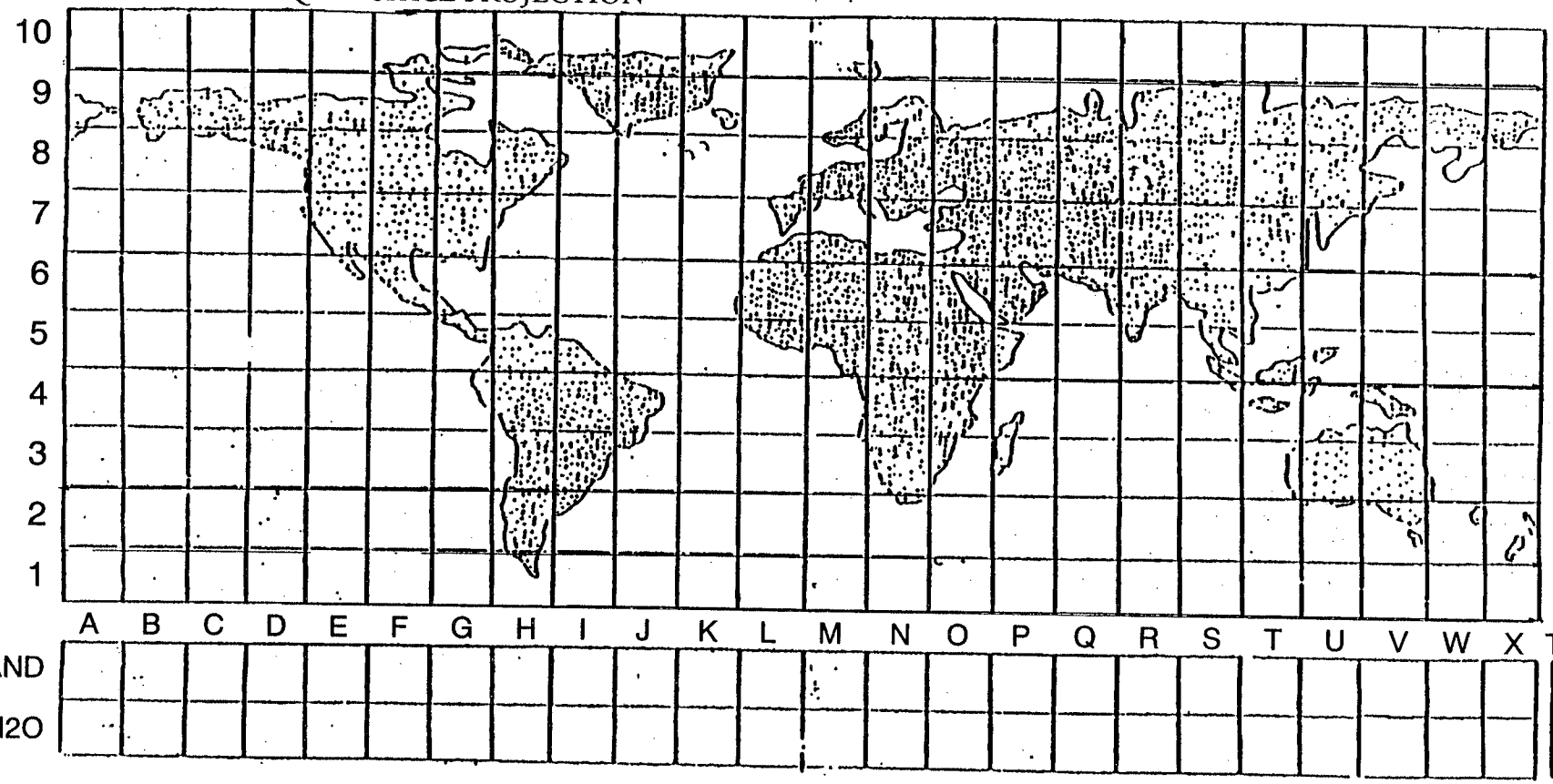
Surf 'n Sand Count

Name_____

PREDICT WHAT PERCENT OF THE EARTH'S SURVACE IS WATER. _____ (0 - 100%)

Count the number of squares of land and water in each column. Color in the shaded land masses first.

CYLINDRICAL EQUAL SPACE PROJECTION

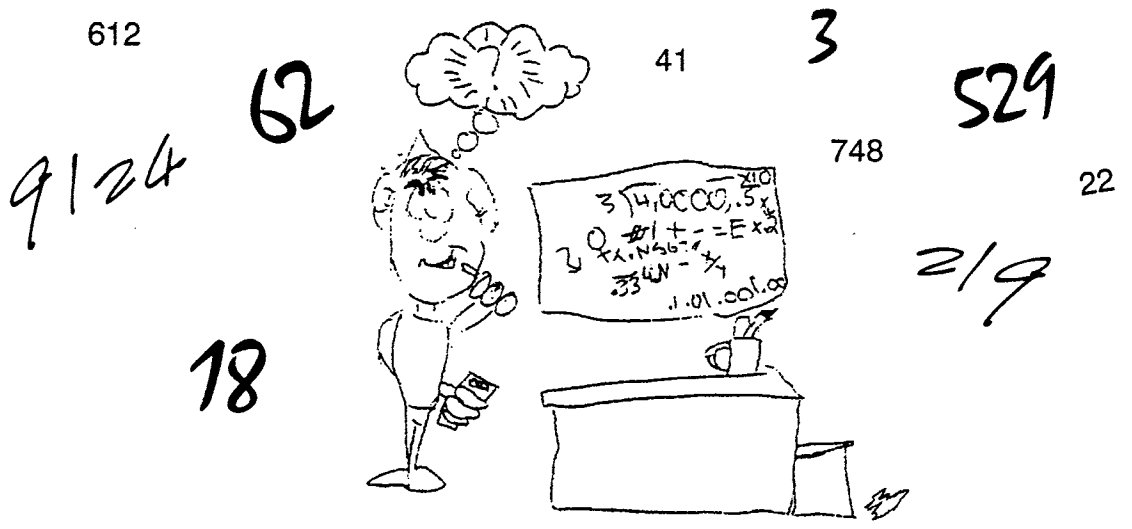


TOTAL AREA OF MAP GRID IN CM

_____ X _____ = _____

	RATIO (Sq. Count total area)	DECIMAL	PERCENT (decimal x 100)
LAND			
WATER			

GREAT LAKES MATH



1. Geologists say the Great Lakes were formed 12,000 years ago.
   a) How many months is that? b) How many weeks?

2. Lake Superior has a surface area of 31,700 square miles. If a square mile has 640 acres, how many acres does Lake Superior contain?

3. Lake Ontario, the smallest of the Great Lakes, has 7300 square miles. Approximately how many times larger is Lake Superior than Lake Ontario?

4. Lake Superior has a maximum depth of 1330 feet. Lake Erie has a maximum depth of 210 feet. Approximately how much deeper is Lake Superior than Lake Erie.

5. Lake Michigan is the only one of the Great Lakes entirely in the U.S. It has a population of 13,900,000. Lake Erie has a population of 11,300,000 in the United States and 1,600,000 in Canada. What is the difference in total population of the two?

6. There are 1692 islands in the Thousand Islands and 30,000 in Georgian Bay. How many more islands are in Georgian Bay?

7. A fathom is 6 feet. If the greatest depth of Lake Huron is 125 fathoms, how many feet is that?

8. If the greatest depth of Lake Erie is 210 feet, how many fathoms is that?

9. The greatest known depth in the world is near Guam - 5269 fathoms. Approximately how many times deeper is that than Lake Huron? (See problem #7)

10. Ice floats in fresh water with one-tenth of its mass above water. Ice in salt water has one-ninth of its mass above water. If there are identical 5400-pound blocks of ice in fresh and salt water, how much would be above water.
    a) in fresh water? b) in salt water?

11. In earlier days, a Great Lakes ship carried only 932 tons. How many pounds is that?

12. A large modern ship carries a cargo of 30,000 tons. How many pounds is that?

13. A large ore carrier may be 1000 feet long. How many football fields (100 yards) is that?

14. Following are the greatest depths of the five lakes: Huron-125 fathoms; Erie-35 fathoms; Ontario-123 fathoms; Michigan-145 fathoms; Superior-168 fathoms. What is the average depth of the lakes in fathoms?

15. In problem 14, what is the average depth in feet?

16. In one 10-year period, the tonnage of all Great Lakes Ports was 1,148,370,000. What was the average annual tonnage?

17. One-third of the equipment for the invasion of Europe in World II was produced in the states bordering the Great Lakes, the cost of that equipment was $61 billion. What was the total cost of the equipment for the invasion?

18. The Great Lakes cover an area of 94,000 square miles. What is the average area of the five lakes?

19. States bordering the Great Lakes have a population of about 40,000,000. If the population of the U.S. is 250,000,000, what percentage of the people live in Great Lakes states?

20. The Edmund Fitzgerald went down in a storm with winds of between 50 and 60 knots. If a knot is 1.15 miles per hour, what was the wind speed
    a) at 50 knots? b) at 60 knots?